UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P O Box 1450
Alexandria, Virginia 22313-1450
www uspto gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,941	07/10/2003	Kazuki Takemoto	03560.003339	1080

5514 7590 03/06/2008
FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
BRIER, JEFFERY A	

ART UNIT	PAPER NUMBER
2628	

MAIL DATE	DELIVERY MODE
03/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/615,941	**Applicant(s)** TAKEMOTO ET AL.	
	Examiner Jeffery A. Brier	**Art Unit** 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _07 January 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-3 and 5-18_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-3 and 5-18_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/07/2008 has been entered.

Response to Amendment

2. The amendment filed on 01/07/2008 has been entered.

The amendment filed 01/07/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Changing "real object" to "operating unit" is not supported by applicants originally filed specification. Refer to the discussion in the arguments section below concerning 112 first paragraph and the below 35 USC 112 first paragraph rejection.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

3. Applicant's arguments filed 01/07/2008 have been fully considered but they are not persuasive for the following reasons.

112 first paragraph rejection

On page 11 applicant proffers that the amendments to independent claims 1, 5, and 16 overcomes the 35 USC 112 first paragraph rejection and the amendment to the specification overcomes the new matter objection both of which were set forth in the office action mailed on 10/05/2007, however, the "operating unit" language added to the specification and these claims corresponds to "operating unit 1090" of applicants specification which does not generate position and orientation of a plurality of positions in real space "for setting a constraining shape by using a shape generated based on the inputted three-dimensional position information in case of the input of the constraining shape" (claims 1, 5, and 19) and for "obtaining a constraining shape by using a shape generated based on the obtained three-dimensional position information" (claim 10). Note applicant also added "operating unit moved by a user in the real space" to claim 10 in the 01/30/2007 amendment. Applicants specification in paragraphs 30, 31, 32, 44, 69, 82, 83, 84, and 85 discuss operation unit 1090 as controlling the virtual object and in paragraphs 28, 30, 42, and 50 discuss stylus 1060 as setting the position and orientation of a plurality of positions in real space used "for setting a constraining shape by using a shape generated based on the inputted three-dimensional position information in case of the input of the constraining shape" (claims 1, 5, and 16) and used for "obtaining a constraining shape by using a shape generated based on the

obtained three-dimensional position information" (claim 10). The specification does not convey the operating unit 1090 is moved to measure the three-dimensional position information used "for setting a constraining shape by using a shape generated based on the inputted three-dimensional position information in case of the input of the constraining shape" (claims 1, 5, and 19) and used for "obtaining a constraining shape by using a shape generated based on the obtained three-dimensional position information" (claim 10). Thus, applicants originally filed specification does not convey that applicant had possession of the amendments to claims 1, 5, 10, and 16.

<u>103 rejection</u>

Argument 1:

On page 13 and first paragraph on page 14 applicant argues the obtaining step of claim 10: (1) obtaining three-dimensional position information of a plurality of positions designated by an operating unit moved by a user in the real space, the operating unit being capable of measuring the position and orientation. Applicant on page 13 last sentence argues "If the shapes of the real objects are known in advance, there would be no need to obtain three-dimensional position information in order to obtain a constraining shape. Further, nothing in Kitamura suggests that the 6 DOF tracker is capable of measuring position <u>and orientation.</u>" Applicant then on page 14 argues "As discussed above, Kitamura does not teach the obtaining step of Claim 10 because if fails to teach or suggest obtaining three-dimensional position information of a plurality of positions that are used to obtain a constraining shape, or an operating unit capable of measuring position and orientation.", however, both of these arguments are

not persuasive because the shape of the real objects are known in advance to manipulating a virtual object, see section 5 first paragraph, which requires an input of the three-dimensional positions. Additionally section 2 at lines 7-14 states “To bring an object that already exist in the real world into a computer-generated virtual world, it is necessary to construct accurate shape representation of the real object in a computer system. A traditional method for this is to use conventional modeling software after precisely measuring the size or length of the real object by hand.”. Thus, sections 5 and 2 suggest using a computer input device, such as a 6 DOF tracker, to measure the real object in order to have accurate shape representation of the real object’s constraining shape.

Argument 2:

On page 14 second paragraph applicant argues the determining step of claim 10: (2) determining an input of a constraining shape or an operation of the virtual object. Applicant argues “Applicants have found nothing in those passages that would teach or suggest “determining an input of a constraining shape or an operation of the virtual object," as recited in Claim 10.”, however, the shape of the real objects are known in advance which means an input of a constraining shape corresponding to the real object was input and a determination of the constraining shape is made during the operation of the computer program.

Argument 3

In the paragraph spanning pages 14 and 15 as well as the following paragraph on page 15 applicant argues the obtaining step of claim 10: (3) obtaining a

constraining shape by using a shape generated based on the obtained three-dimensional position information in case of the input of the constraining shape.

Applicant argues “Applicants strongly disagree. Kitamura's discussion of a method of precisely measuring the size or length of the real object by hand is completely contradictory to a suggestion of using a computer input device to measure the real object.” and "Applicants respectfully disagree. Kitamura makes clear that the shapes of the real objects are assumed to be known in advance. Thus, there is no suggestion whatsoever of using the 6 DOF tracker to input the 3D coordinates of the constraining shapes.”, however, to one of ordinary skill in the art the position and orientation of the real objects that will be interacted with the 6 DOF tracker would be efficiently known in advance by using the 6 DOF tracker to measure the real object by the usermoving the 6 DOF tracker “by hand”.

These three arguments concerning the 35 USC 103 rejection have been fully considered but they are not persuasive because as discussed in applicants specification at paragraphs [0028], [0041], [0050], [0068], and [0078] alternative means for stylus 1060 for inputting the 3D coordinates of the constraining shape is possible, thus, the claimed “inputting means for inputting three-dimensional position information of a plurality of positions inputted by moving an operating unit in the real space by a user, the operating unit being capable of measuring the position and orientation in the real space” of claim 1; “an inputting step of inputting three dimensional position information of a plurality of positions inputted by moving an operating unit in the real space by a user, the operating unit being capable of measuring the position and orientation in the

real space" of claim 5; "obtaining three-dimensional position information of a plurality of positions designated by an operating unit moved by a user in the real space, the operating unit being capable of measuring the position and orientation" of claim 10; and "an inputting unit configured to input three-dimensional position information of a plurality of positions inputted by moving an operating unit in the real space by a user, the operating unit being capable of measuring the position and orientation in the real space" of claim 16 may be means other than stylus 1060 which alternative means is taught by 6 DOF tracker device of Kitamura. Applicant previously amended the setting means of claim 1, the setting step of claim 5, the obtaining a constraining step of claim 10, and the setting unit of claim 16 to claim "constraining shape by using a shape generated based on the inputted (or obtained) three-dimensional information". The 6 DOF tracker device of Kitamura suggests using the 6 DOF tracker device to input 3D coordinates of the constraining shape since a means to input the constraining shape is inherently present and because the real object with inputted constrained properties is moved by the user using the 6 DOF tracker device which will allow for less input devices being used in Kitamura's system. Additionally section 2 at lines 7-14 states "To bring an object that already exist in the real world into a computer-generated virtual world, it is necessary to construct accurate shape representation of the real object in a computer system. A traditional method for this is to use conventional modeling software after precisely measuring the size or length of the real object by hand." which suggests using a computer input device to measure the real object in order to have accurate shape

representation of the real object's constraining shape. The previous 103 rejection is maintained and reproduced below with modifications reflecting claim amendments.

Furthermore applicant appears to be arguing there is a claimed order to the claimed steps and functions, however, the claims do not claim any order for the claimed steps. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Thus, using Kitamura's 6DOF to input the position and orientation of the real objects to have the shapes "known in advance" before interacting with the virtual objects meets the steps of claims 5 and 10 and meets the functions of claims 1 and 16. See Interactive Gift Express, Inc. v. Compuserve Inc., 256 F.3d 1323, 1342-43 (Fed. Cir. 2001). See also more recent decisions making reference to Interactive: 2007/06/29 06-1584.pdf DCT Frazier v. Layne Christensen Company N; 2007/11/19 07-1150.pdf PTO In Re Chatani N**;** and Baldwin Graphic Systems Inc. v. Siebert Inc., 85 USPQ2d 1503, 1508 (Fed. Cir. 2008), 2008/1/15 07-1262.pdf DCT Baldwin Graphic Systems v. Siebert P**.**

Also note the newly cited Fa article teaches: (2) determining an input of a constraining shape or an operation of the virtual object; and (3) obtaining a constraining shape by using a shape generated based on the obtained three-dimensional position information in case of the input of the constraining shape.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-3 and 5-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The 01/07/2008 amendment to independent claims 1, 5, and 16 “input three-dimensional position information of a plurality of positions inputted by moving an operating unit in the real space by a user” and the 01/30/2007 amendment to claim 10 "obtaining three-dimensional position information of a plurality of positions designated by an operating unit moved by a user in the real space" is not conveyed by the originally field specification because applicants specification in paragraphs 30, 31, 32, 44, 69, 82, 83, 84, and 85 discuss operation unit 1090 as controlling the virtual object and in paragraphs 28, 30, 42, and 50 discuss stylus 1060 as setting the position and orientation of a plurality of positions in real space. The specification does not convey the operating unit 1090 is moved to measure the three-dimensional position information used "for setting a constraining shape by using a shape generated based on the inputted three-dimensional position information in case of the input of the constraining shape" (claims 1, 5, and 19) and used for “obtaining a constraining shape by using a shape generated based on the obtained

three-dimensional position information" (claim 10). Thus, applicants originally filed specification does not convey that applicant had possession of the amendments to claims 1, 5, 10, and 16.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-3 and 5-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshifumi Kitamura and Fumio Kishino, Consolidated Manipulation of Virtual and Real Objects, September 1997, Proceedings of the ACM symposium on Virtual reality software and technology, pages 133-138. Kitamura teaches an augmented reality system that uses object constraints to control the visual interaction between the virtual objects and the real objects.

A detailed analysis of the claims follows.

Claim 10:

Kitamura teaches an information processing method for changing the position and orientation of a virtual object in mixed reality space obtained by combining a real space and a virtual space, said method comprising the steps of:

obtaining three dimensional position information of a plurality of positions designated by an operating unit moved by a user in the real space (*In view of page 135 first paragraph under the heading of 5 Consolidated Manipulation Environment of Kitamura the same 6 DOF tracker device is used to control the position of a virtual world object(s) and to control the position of a constraining real world object(s) which is similar to applicants system where stylus 1060 is used to control the virtual world object(s) and*

to control the location of the constraining real world object(s), see applicants paragraphs [0028], [0030], and [0041]. The 6 DOF has a stylus the user moves which meets the "operating unit moved by a user in the real space" claim limitation.), the operating unit being capable of measuring the position and orientation in the real space (*The 6 DOF measures position and orientation in real space of the sylus on the 6 DOF.*);

determining an input of a constraining shape or an operation of the virtual object (*The system determines if a shape having constraints is being input for the real object such as a toy block (section 4.1) or surface (section 5.4) or such as moving the real object which has a constraining shape and the system determines if the user is moving the virtual object.*);

Kitamura does not fully teach: obtaining a constraining shape <u>by using a shape generated based on the obtained three-dimensional position information</u> in the case of the input of the constraining shape (*The first paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual world objects and to position the constraining real world objects. The shape of the real world object(s) are used to constrain the movement of the virtual world object(s) by giving the real world object(s) a shape that the virtual world object(s) interacts with in a constrained manner. A step of inputting the shape of the real world objects constraining shape is inherently present.*). Kitamura's use of the 6 DOF tracker device to control the position of the real world object suggests using the same 6 DOF tracker device to input the constraining shape of the real world object since this would require less input devices for the user to use and learn how to use. Additionally section 2 at lines 7-14 states "To bring an object

that already exist in the real world into a computer-generated virtual world, it is necessary to construct accurate shape representation of the real object in a computer system. A traditional method for this is to use conventional modeling software after precisely measuring the size or length of the real object by hand." which suggests using a computer input device to measure the real object in order to have accurate shape representation of the real object's constraining shape. Thus, it would have been obvious to one of ordinary skill in the art at the time of applicants invention to input with the 6 DOF tracker device the 3D coordinates of the constraining shape because the toy block (section 4.1) or surface (section 5.4) need to have their respective constraining coordinates input in order for the virtual object to properly interact with the real objects since this will require less input devices for the user to use and learn how to use and because section 2 at lines 7-14 suggests using a computer input device to measure the real object in order to have accurate shape representation of the real object's constraining shape. To one of ordinary skill in the art the position and orientation of the real objects that will be interacted with the 6 DOF tracker would be efficiently known in advance by using the 6 DOF tracker to measure the real object by the user moving the 6 DOF tracker "by hand". KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (U.S. 2007), U.S. Supreme Court No. 04-1350 Decided April 30, 2007, 127 SCt 1727, 167 LEd2d 705.;

Kitamura further teaches changing the position and orientation of the virtual object according to instructions from the user, based on the obtained constraining shape as constraint condition in case of the operation of the virtual object (*The first*

paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual world object(s). The shape of the real world object(s) are used to constrain the movement of the virtual world object(s) by giving the real world object(s) a shape that the virtual world object(s) interacts with in a constrained manner. Sections 5.1 to 5.4 discusses manipulation of the virtual world object based upon constraint conditions based on the shape of the real world object in response to the user using the 6 DOF tracker device. The constraining shape generated from the three-dimensional position information constrains the interaction of the virtual world object with the real world object, see sections 2, 4 to 5.4. The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.); and

combining an image of the virtual object generated according to the changed position and orientation, and the real image (*The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual world object with a real world object. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual world object is moved according to the constraints of the real world object. Sections 2, 4, and 5 discusses mixing the virtual and real world images of virtual and real world objects.*).

Claim 11:

Kitamura teaches an information processing method according to Claim 10, further comprising the step of combining a virtual image indicating the constraining

shape with the real image (*The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints. Sections 2, 4, and 5 discusses mixing the virtual and real world images of virtual and real world objects.*).

Claim 12:

Kitamura teaches an information processing method according to Claim 10, wherein the constraining shape is a plane. (*On page 136 in the text above figure 2 discusses determining a plane and using the plane to constrain movement of the virtual object is discussed with regards to figure 2.*).

Claim 13:

Kitamura teaches an information processing method according to Claim 10, wherein said changing step changing the position and orientation of the virtual object is carried out by changing the position and orientation of the operating unit (*The 6 DOF tracker device is an operating unit. The user using the 6 DOF tracker device manipulates the virtual objects by changing the position and orientation of the 6 DOF tracker device.*).

Claim 14:

Kitamura teaches a computer program product comprising a computer readable medium storing computer program code for performing the information processing method according to Claim 10 wherein the information processing method is executed by a computer device (*This article is directed to computers that generate the augmented*

reality scene since it was published by ACM for a symposium on virtual reality software and technology and since at page 133 in the last sentence in the second paragraph of section 1 "software/hardware" is discussed. Software causing a computer to perform Kitamura's augmented reality is inherently stored in a computer readable recording medium.).

Claim 15:

Kitamura teaches a computer-readable recording medium, storing the computer program according to Claim 14 (*Software causing a computer to perform Kitamura's augmented reality is inherently stored in a computer readable recording medium.*).

Claim 16:

The functions of Kitamura corresponds to the claimed units because the software causes the computer to become a unit that performs a process. As seen below Kitamura performs the claimed processes.

Kitamura teaches an information processing device for aiding control operations relating to controlling the position and orientation of a virtual object, said device comprising:

an image capturing unit configured to capture a real image in real space (*The measurements by the user in three dimensional real space, the device for obtaining the 3-D shape by using a range image, and the device for obtaining the 3-D shape by using multiple cameras captures a real image in real space. The three paragraphs found in section 2 on page 134 of Kitamura teaches the user measuring the real objects, a device measuring the real objects with range in response to the user, or a device*

measuring the real objects with multiple cameras range in response to the user. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation. Note applicants paragraph [0024] does not restrict the image capturing unit to a particular type);

a virtual image generation unit configured to generate a virtual image of a virtual object according to the position and orientation of said image capturing unit (*Kitamura discusses in section 2 in the first paragraph using conventional modeling software after precisely measuring the size or length of the real object by hand or by the devices which is an generation unit capable of generating three-dimensional positional information. Sections 2, 4 and 5 discuss generating a virtual image(s) of a virtual object(s).*) ;

a superimposing unit configured to superimpose the generated virtual image with the captured real image (*Sections 2, 4, and 5 discusses mixing the virtual and real world images of virtual and real world objects.*);

a determination unit configured to determine an input of a constraining shape or an operation of the virtual object (*The system determines if a shape having constraints is being input for the real object such as a toy block (section 4.1) or surface (section 5.4) or such as moving the real object which has a constraining shape and the system determines if the user is moving the virtual object.*);

an inputting unit configured to input three-dimensional position information of a plurality of positions inputted by a moving a operating unit in the real space by a user (*In view of page 135 first paragraph under the heading of 5 Consolidated Manipulation Environment of Kitamura the same 6 DOF tracker device is used to control the position*

of a virtual world object(s) and to control the position of a constraining real world object(s) which is similar to applicants system where stylus 1060 is used to control the virtual world object(s) and to control the location of the constraining real world object(s), see applicants paragraphs [0028], [0030], and [0041]. The 6 DOF has a stylus the user moves which meets the "moving a real object limitation in the real space by a user" claim limitation.), the operating unit being capable of measuring the position and orientation in the real space (*The 6 DOF measures position and orientation in real space of the sylus on the 6 DOF.*);

Kitamura does not fully teach: a setting unit configured to set a constraining shape <u>by using a shape generated based on the inputting three-dimensional position information</u> in the case of the input of the constraining shape (*The first paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual world objects and to position the constraining real world objects. The shape of the real world object(s) are used to constrain the movement of the virtual world object(s) by giving the real world object(s) a shape that the virtual world object(s) interacts with in a constrained manner. A step of inputting the shape of the real world objects constraining shape is inherently present.*). Kitamura's use of the 6 DOF tracker device to control the position of the real world object suggests using the same 6 DOF tracker device to input the constraining shape of the real world object since this would require less input devices for the user to use and learn how to use. Additionally section 2 at lines 7-14 states "To bring an object that already exist in the real world into a computer-generated virtual world, it is necessary to construct accurate shape

representation of the real object in a computer system. A traditional method for this is to use conventional modeling software after precisely measuring the size or length of the real object by hand." which suggests using a computer input device to measure the real object in order to have accurate shape representation of the real object's constraining shape. Thus, it would have been obvious to one of ordinary skill in the art at the time of applicants invention to input with the 6 DOF tracker device the 3D coordinates of the constraining shape because the toy block (section 4.1) or surface (section 5.4) need to have their respective constraining coordinates input in order for the virtual object to properly interact with the real objects since this will require less input devices for the user to use and learn how to use and because section 2 at lines 7-14 suggests using a computer input device to measure the real object in order to have accurate shape representation of the real object's constraining shape. To one of ordinary skill in the art the position and orientation of the real objects that will be interacted with the 6 DOF tracker would be efficiently known in advance by using the 6 DOF tracker to measure the real object by the user moving the 6 DOF tracker "by hand". KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (U.S. 2007), U.S. Supreme Court No. 04-1350 Decided April 30, 2007, 127 SCt 1727, 167 LEd2d 705.; and

Kitamura further teaches an operating unit configured to control the position and orientation of the virtual object based on the constraining shape in accordance with the a user's instruction in case of the operation of the virtual object.(*Sections 5.1 to 5.4 discusses manipulation of the virtual world object based upon constraint conditions based on the shape of the real world object in response to the user using the 6 DOF*

tracker device. The constraining shape generated from the three-dimensional position information constrains the interaction of the virtual world object with the real world object, see sections 2, 4 to 5.4. The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.).

Claim 17:

Kitamura teaches an information processing device according to Claim 16, wherein the constraining shape is defined by polygons (*Figure 2's Cubes are formed with polygons.*) and the apexes of the polygons are at positions inputted by the user (*As discussed in the a setting unit above it would have been obvious to use the 6 DOF tracker device to input the constraining shape of the real world object which would input the apexes of the constraining shape of the polygon.*) or the constraining shape is a plane passing through the positions inputted by the user (*A real sensed surface is a planar real world object whose position is inputted by the user in the* setting unit. *As discussed in the a setting unit above it would have been obvious to use the 6 DOF tracker device to input the constraining shape of the real world object which would input plane for a surface.*).

Claim 18:

Kitamura teaches an information processing device according to Claim 16, wherein said operating unit performs at least one of the following operations in performing an operation controlling the position and orientation of the virtual object:

a translation operation for causing translational movement of the virtual object based on the constraining shape (*Page 137 column 1 lines 1-3 teaches translation when the virtual object collides with the real surface.*); or

a rotation operation for rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact (*Page 137 column 1 lines 1-3 teaches rotation when the virtual object collides with the real surface.*) (*Page 137 column 1 lines 1-3 also teaches translation and rotation when the virtual object collides with the real surface*).

Claims 1-3:

Means plus function claims 1-3 correspond to device claims 16-18 and the means of Kitamura, software and computer, are equivalent to applicant's means of software and computer.

Claims 5-7:

Step for claims 5-7 correspond to device claims 16-18 and the steps of Kitamura, software and computer, are equivalent to applicant's steps performed by software and computer.

Claims 8 and 9:

Claims 8 and 9 mirror claims 14 and 15 addressed above and they are rejected for the same reasons given above for claims 14 and 15.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

IBM Technical Disclosure Bulletin, September 1997, Vol. 40, No. 9, pages 79-82.This document discusses "Navigation constraints in a Virtual Reality environment are implemented by placing collision boundaries around an otherwise punctual, navigable view point. By adjusting these collision boundaries according to the view point's field of view, the designers can implement cheaply, useful navigation constraints that will prevent users to move their points of view too close to objects and loose sight of the environment's context."

Terrence Fernando, Norman Murray, Kevin Tan, Prasad Wimalaratne; Software Architecture for a Constraint-based Virtual Environment; Year of Publication 1999; Virtual Reality Software and Technology, Proceedings of the ACM symposium on Virtual reality software and technology; pages 147 – 154. This document discusses constraint based modeling in section 2.2.

Mingxian Fa, Terrence Fernando, Peter M. Dew; Interactive Constraint-based Solid Modeling using Allowable Motion; Year of Publication: 1993; ACM Symposium on Solid and Physical Modeling, Proceedings on the second ACM symposium on Solid modeling and applications; pages: 243 – 252. This document discusses in the first and second paragraphs of the introduction and in section 3.2 allowing the user to define constraints stored in Relationship Graph (RG) for use during manipulation of virtual objects.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A Brier whose telephone number is (571) 272-7656. The examiner can normally be reached on M-F from 7:30 to 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (571) 272-7664. The fax phone Number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jeffery A. Brier/
Primary Examiner, Division 2628